Psychological Needs as Basic Motives, Not Just Experiential Requirements

Kennon M. Sheldon and Alexander Gunz
University of Missouri–Columbia

ABSTRACT Self-determination theory (SDT) posits 3 evolved psychological needs, for autonomy, competence, and relatedness. Considerable research has established that all 3 experiences are important for well-being. However, no SDT research has examined whether unmet needs have motivational force, an important criterion for establishing that certain experiences are indeed basic needs and motives (R. F. Baumeister & M. R. Leary, 1995). Three studies, using cross-sectional, experimental, and longitudinal methodologies, supply evidence that felt deficits in autonomy, competence, and relatedness arouse corresponding desires to acquire the missing experiences. However, a positive surfeit of felt-need satisfaction did not predict reduced desires for the corresponding needs. Implications for homeostatic, evolutionary, and humanistic perspectives upon basic psychological needs are discussed.

Two research programs have revitalized the study of psychological needs. One, rooted in Self-determination theory (SDT; Deci & Ryan, 1985, 2000) posits three needs, relatedness, competence, and autonomy, as experiential nutrients essential for well-being (Deci & Ryan, 2000). The other program, stemming from Baumeister and Leary's (1995) groundbreaking *Psychological Bulletin* article, describes the need for belongingness as a fundamental motivating force that evolved to propel us into the good graces of others—a critical goal for members of such a social species. This paper brings these programs together, suggesting that SDT's trio of needs not only sustain well-being (as they are already documented to do) but may also, like the need for belongingness, motivate remedial behavior when missing.

It is far from an accident, according to Baumeister and Leary (1995), that humans have a need to belong. Those of our ancestors

Correspondence concerning this article should be addressed to Ken Sheldon, Department of Psychological Sciences, University of Missouri, Columbia, MO 65211. E-mail: sheldonk@missouri.edu.

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who affiliated well with others would have benefited from groups' abilities to share food, supply mates, care for offspring, hunt large animals, be vigilant for threats, defeat strong enemies, and so forth. Because successful group living is so central to our survival, Baumeister and Leary postulated that the desire to feel belongingness evolved as a fundamental human need and motive. How do we tell which proposed needs are truly fundamental? Baumeister and Leary enumerated a set of nine plausible criteria and argued that the need for belongingness fulfilled all of them. Specifically, they claimed that a fundamental need should (a) produce effects readily under all but adverse conditions, (b) have affective consequences, (c) direct cognitive processing, (d) lead to ill effects (such as on health or adjustment) when thwarted, (e) elicit goal-oriented behavior designed to satisfy it (subject to motivational patterns such as object substitutability and satiation), (f) be universal in the sense of applying to all people, (g) not be derivative of other motives, (h) affect a broad variety of behaviors, and (i) have implications that go beyond immediate psychological functioning.

SDT, too, posits evolved psychological needs. However, it has traditionally looked at needs in a slightly different light. Because the theory began by trying to understand how intrinsic motivation can be undermined (Deci, 1972), an important issue for SDT researchers has been whether or not social environments meet people's needs, ultimately supporting (or not) their motivation, growth, and well-being (Deci & Ryan, 2000). Thus, the focus has been on needs as experiential outcomes that are affected by contexts rather than as internal motives that can direct behavior in their own right. SDT postulates three basic psychological needs: a need for competence (i.e., to feel effective, skillful, and able to master the challenges of life), a need for autonomy (i.e., to feel that one causes, identifies with, and endorses one's own behavior), and a need for relatedness (i.e., to feel close and accepted with important others and with important groups of others). The latter is conceptually similar to the need for belongingness.

Much recent empirical work has supported the SDT conception, showing that autonomy, competence, and relatedness each make unique predictive contributions to many kinds of thriving and well-being outcomes. This has been shown with respect to daily well-being (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000), secure relationship attachments (La Guardia, Ryan, Couchman, & Deci,

2000), "most satisfying events" (Sheldon, Elliot, Kim, & Kasser, 2001), positive teacher–course evaluations (Filak & Sheldon, 2003), and effective work performance and satisfaction (Baard, Deci, & Ryan, 2004), to name just a few. Furthermore, and supporting the proposed universality of these three needs, these effects have been shown to occur in a wide variety of cultural contexts (Chirkov, Ryan, & Willness, 2005; Deci et al., 2001; Sheldon et al., 2001). The importance of autonomy, competence, and relatedness has also been shown in longitudinal analyses, in which the accumulation of these experiences over time mediates to a wide variety of positive outcomes (La Guardia et al., 2000; Sheldon & Elliot, 1999; Sheldon & Krieger, 2007).

Notably, the corpus of evidence for SDT's need model, although broad and impressive, has primarily focused on only three of Baumeister and Leary's (1995) nine criteria. Specifically, it has produced much evidence for the second criterion (that needs have affective consequences) and the fourth criterion (that needs have ill effects when thwarted) and is now accumulating evidence on the sixth criterion, too (the universality of needs). However, SDT research has not yet addressed the fifth criterion, that deficient psychological needs should engender corresponding responses. Indeed, without the ability to prompt some form of ameliorative response, it is hard to imagine how a psychological need could confer a survival advantage, which is to say, how it could evolve. A person who feels lonely should seek company, a person who feels incompetent should try to improve his or her skills, and a person who feels controlled should try to seek greater freedom. In the process, more adaptive behavior would presumably ensue. Reflecting the centrality of this issue, several other criteria on Baumeister and Leary's list besides the fifth imply that needs have motivational force (i.e., the first criterion that needs produce behavioral effects, the third criterion that they direct cognitive processing, and the ninth criterion that they affect a broad variety of behaviors).

We suggest that it is important for SDT researchers to show that the three proposed basic needs have effects on goal-directed preferences as well as having effects on well-being and thriving. If people really need something, then when the need is unmet they should want to get the need, just as they want to get food, water, or sleep when these physical needs are unmet. We refer to this as the "needs-as-motives" hypothesis. Indeed, if people missing a certain experience

seem to show no interest in that experience, it would be difficult to argue that they have a need for it. The opposite implication of the needs-as-motives hypothesis is that if a particular need is currently satisfied, then people should turn their attention to other, less satisfied needs. In other words, met needs should (to some extent) bow to unmet needs, so that the overall level of need satisfaction can be optimized and so people can approach the balance of need satisfaction that conduces to the most optimal well-being (Sheldon & Niemiec, 2006). As an example of this reasoning, if a person currently feels very connected to others but not very competent, then she should experience a more pressing desire to become more competent than to become more connected. As such, social goals may be somewhat crowded out of their awareness by more salient competence goals (Brendl, Markman, & Messner, 2003).

Some further explication of our SDT-based needs-as-motives hypothesis may be warranted. The flow of a typical SDT path model shows social context producing psychological need satisfaction, which, in turn, produces intrinsic (or internalized) motivation and/or positive affect, both of which have well-known implications for performance (Deci & Ryan, 2000). Need satisfaction is therefore conceptualized as an important experiential mediator between social contexts and a variety of outcomes. However, the theory typically does not specify a link between the type of need satisfied (or unsatisfied) and the specific type of behavior that results; instead, need satisfaction, as an aggregate sum, is said to provide nonspecific impetus for adaptive, proactive behavior in general. Thus, satisfied needs provide the resources for positive motivation and behavior. In this article, we are testing the idea that unsatisfied needs also create a desire for experiences that would specifically satisfy the lacking need. From this perspective, people can proactively try to get their own needs met despite sometimes suboptimal internal resources rather than waiting for the context to do it for them (Sheldon & Elliot, 1999). We suggest that this perspective is consistent with SDT's focus on the active individual.

Indeed, the idea that unmet psychological needs impel remedial responses has been found in many need theories of the past. Maslow's (1943, 1971) hierarchical model, for example, states that people strive to meet their needs in sequential order and do not turn their attention to "the next level up" until lower level needs are satisfied. The needs-as-motives idea is also central within social

motive (or "motive disposition") approaches to needs, which postulate that acquired needs (such as the need for intimacy, achievement, or power) show themselves largely via their effects upon spontaneous behavior and cognition (McClelland, 1985). Thus, for example, a person high in the achievement motive, according to the Thematic Apperception Test (TAT), tends to seek out and orient toward achievement situations and also tends to interpret ambiguous stimuli or situations in terms of their relevance for his or her achievement need (cf. McClelland, 1985; McClelland, Atkinson, Clark, & Lowell, 1953).

The needs-as-motives hypothesis has also found a considerable amount of recent experimental support with respect to the need for belongingness. For example, Maner, DeWall, Baumeister, and Schaller (2007) showed that threatening people with social exclusion motivated a variety of behaviors designed to reestablish social bonds, such as expressing greater interest in making new friends, showing an increased desire to work with others, forming more positive impressions of novel social targets, and assigning greater rewards to new interaction partners. Similarly, Gardner, Pickett, Jefferis, and Knowles (2005) and Gardner, Pickett, and Brewer (2000) showed that inducing loneliness or rejection was associated with increased attention to social cues and opportunities, and Carvallo and Gabriel (2006) showed that dismissing-avoidant individuals, who are presumably low in relatedness need satisfaction, derived greater benefits when persuaded that others liked and accepted them.

Although the needs-as-motives model being endorsed here seems to make intuitive sense (Baumeister & Leary, 1995), there are reasons to question the idea. First, it may be that psychological needs are not really *homeostatic*, as are cyclical physical needs for food, water, rest, and so on. Certainly, psychological needs do not make such pressing demands on the body when left unsatisfied. Still, we suggest that people become accustomed to a typical level of need-relevant experiences in their lives, such that falling below that expected baseline can motivate compensatory activity. For example, a certain student may become accustomed to the level of competence suggested by a "B" average, such that getting a "D" on the first exam might produce a psychological discomfort that prompts extra studying for the next exam. Getting an "A," in contrast, might prompt a relaxation of alertness, leading to less studying and possibly more attention available to other classes. Although such a process would not be

homeostatic in a physiological sense, it might closely approximate a homeostatic process.

A second issue for the needs-as-motives perspective arises from the fact that, although lower level needs are invariant in how they must be satisfied (hunger demands food, thirst water) higher level needs may be more *substitutable* (i.e., the negative self-image caused by a threat to one's intelligence might be ameliorated by reaffirming one's relationships within one's family; Steele, 1988). However, in this research we are testing the idea that specific deficits prompt specific experiential desires, thus assuming that the needs are not substitutable. This is logical from an evolutionary perspective, if we assume that each need corresponds to a different class of adaptive problems. As in the earlier example, a person who is currently incompetent should not be content merely to acquire feelings of relatedness because this would not ultimately solve his or her competence problem.

A third issue is raised by the possibility that some people become *sensitized* to a particular need, such that the more they have the more they want, instead of vice versa (Moller, Deci, & Elliott, 2008). In this case the need may function more like a "being" or "growth" need in the Maslovian sense (Maslow, 1971); growth needs (such as self-actualization or the appreciation of beauty) are said to be strengthened after satisfaction, whereas "deficiency" needs are said to be reduced after satisfaction. In this research we are assuming that the three proposed SDT needs function as deficiency needs, at least when they are unmet. Again, 3 of Baumeister and Leary's (1995) 12 criteria for identifying needs imply that unmet needs motivate remedial behavior, and it is difficult to explain how the needs could have evolved if those lacking a need were even less motivated, not more motivated, to obtain that need. As noted above, this would portray individuals as passive victims of the social context who have no internally generated way of returning to a state of satisfaction once the context has thwarted them.

What about when an SDT need is currently well met: Should people want less of that experience or more of it? We made no predictions regarding this sensitization-related issue because, on the one hand, a relative reduction in motive strength for a satisfied need would be adaptive if this freed up energy to be devoted to more pressing problems. But, on the other hand, strong feelings of satisfaction should be positively reinforcing, such that one's desire for

more of a positive experience does not decrease just because one is currently having much of that experience. We will examine this issue in the current paper.

Yet a fourth issue for the needs-as-motives hypothesis is that some people may *accommodate* to chronically unmet needs, adopting compensatory motives that are not as fulfilling but are better than nothing (Deci & Ryan, 2000). For example, people chronically deprived of relatedness may develop solitary hobbies or pursuits that distract them from their loneliness, and they may even come to prefer those hobbies and to avoid social connections when opportunities present themselves. In this research we assumed that although such accommodations do occur, the processes involved may be akin to learned helplessness (Abramson, Seligman, & Teasdale, 1978) and the coping responses that are developed when peoples' direct attempts to adapt have been repeatedly thwarted over time. That is, we assume that behavioral adaptation is the normal healthy response to need deprivation but that in some cases it can fail or be overwhelmed, and people will attempt to accommodate instead.

In sum, in the current research we attempted to provide a new type of evidence for SDT's proposal that autonomy, competence, and relatedness are basic needs by showing that each need, when unmet, also influences peoples' desires and preferences. Past SDT research has defined needs only as experiential requirements, which affect well-being by virtue of their presence or absence, but has not yet shown that these needs also have motivational force when unsatisfied. Our definition of a motive involves the desire to act or make a future change in some life domain, a desire that is conceptually distinct from a prior experiential state that may or may not influence desire. This distinction is important because motivation is not an inevitable product of dissatisfaction; for example, a lonely person may or may not seek company. We suggest that the SDT trio of needs is of such fundamental psychological importance, though, that felt deprivation should also produce motivation, at least in relatively healthy and well-adjusted people. We conceive of (more or less satisfied) needs and (more or less present) motives as continuous rather than dichotomous quantities, allowing us to use linear regression to test our hypotheses.

Study 1 supports the needs-as-motives hypothesis by showing that preexisting deficiencies in each of the three needs are associated with a corresponding desire to obtain more of that type of experience.

However, Study 1 also demonstrates that evidencing positive satisfaction of a particular need does not predict less desire for that need, suggesting that both the "growth" and the "deficiency" perspectives on the needs may have merit. Study 2 uses an experimental manipulation to deprive participants of feelings of autonomy, competence, or relatedness, showing that induced deficits tend to create a desire for the missing experience. Finally, Study 3 returns to the correlational methodologies of Study 1, adding a longitudinal element. Specifically, we show that changes in need satisfaction over a 6-week period predict changes in the corresponding motives, suggesting that an active ameliorative process has come into play.

STUDY 1

Method

Participants and Procedure

Participants were 115 introductory psychology students at the University of Missouri, 37 men and 78 women, who participated to help satisfy a course requirement. After signing up for the study they were sent a link to an online survey. The survey first assessed their current level of need satisfaction in life and then asked them to rate their preferences for a variety of experiences.

Measures

Psychological need satisfaction. To measure participants' current autonomy, competence, and relatedness need satisfaction, we began with the nine items used by Sheldon et al. (2001) to assess "most satisfying events" (see also Sheldon & Niemiec, 2006; Sheldon & Tan, 2007). Because all nine of these items were positively worded, we also added nine negatively worded items (three for each need), so that both the presence and the absence of satisfaction would be fully represented. Participants were asked to rate how they had felt in the last week, using a 1 (*not at all true*) to 9 (*very true*) scale. Example positive and negative relatedness items were "I felt close and connected with other people who are important to me" and "I felt unappreciated by one or more important people." Example positive and negative competence items were "I was successfully completing difficult tasks and projects" and "I struggled doing something I should be good at." Example positive and negative autonomy items were "My choices were based on my true interests and values" and "I had a lot of pressures I could do without." After recoding the negatively

worded items and averaging the items, alpha coefficients for autonomy, competence, and relatedness were .71, .74, and .73.

Need-relevant motivations. To assess peoples' motivation to experience each type of need, we began with three items for each need. An example relatedness item was "I would like to find (or create) the perfect romantic relationship, so that I feel I have finally found my 'soul-mate'," an example competence item was "I would like to become very good at some activity that is important to me, and feel less inept and incompetent," and an example autonomy item was "I would like to create a lifestyle where others no longer pressure me, and I am free to do whatever I choose." Participants were asked to rate their agreement with each statement using 1 (*not at all*) to 5 (*very much*) scales. Because principal components analyses of the original nine items revealed inconsistent solutions across studies, an alternative six-item set was identified that produced a consistent three-factor solution across the four studies. Because substantive results were essentially identical across the studies with either the two- or the three-item measures, we present the two-item results herein.

In Study 1, a principal components analysis of the six motivation items with varimax rotation revealed that the autonomy items loaded .88 and .83 on the first component, the competence items loaded .94 and .54 on the second component, and the relatedness items loaded .73 and .93 on the third component (no cross-loadings exceeded .45). The second retained autonomy motivation item was "I would like to rearrange my life and attitudes so that I am doing what *I* really want and choose to do, and feel less controlled by others or by my own internal problems"; the second retained competence motivation item was "I would like to become exceptionally skillful at some game or occupation that I like, so that I am better at it than almost everyone"; and the second retained relatedness motivation item was "I would like to meet more people I can really talk to, who understand me and whom I can count on to be there when I need support."

Results

Table 1 contains the means, standard deviations, and intercorrelations among the study variables. As expected, each of the three needs correlated negatively with the corresponding motivation variable (these correlations are bolded in the table). However, many unpredicted correlations were also in evidence, which we believe reflects the considerable shared common variance among the three need-satisfaction measures. To precisely test our hypotheses, we employed simultaneous regression procedures. Specifically, we conducted three

Table 1
Study 1: Descriptive Statistics and Correlations

	M	*SD*	1	2	3	4	5
1. Autonomy Nsat	1.70	2.85					
2. Competence Nsat	1.77	2.93	.35**				
3. Relatedness Nsat	3.56	2.66	.40**	.38**			
4. Autonomy Mot	3.98	1.28	**−.39****	−.25**	−.28**		
5. Competence Mot	3.58	1.08	−.17	**−.30****	−.24**	.53**	
6. Relatedness Mot	3.47	1.18	−.15	−.22*	**−.39****	.50**	.48**

Note. Nsat = need satisfaction; Mot = motivation. Bolded coefficients were predicted by theory.
*$p < .05$. **$p < .01$.

analyses in which each of the three motivation variables (autonomy, competence, and relatedness) was predicted from the three current satisfaction scores (autonomy, competence, and relatedness). We did this in order to control for the covariation among the three needs and to control for person-level differences in overall need satisfaction or positivity. Our analysis for this study, then, focuses on whether a relative deprivation or surfeit of one need, as compared to (controlling for) the other needs, might produce a shift in motivational priorities.

Table 2 contains the results of these three simultaneous regressions. In support of the hypotheses, there were significant negative associations between each satisfaction score and the corresponding

Table 2
Study 1: Simultaneous Regression Results

	Type of Motivation		
	Autonomy	Competence	Relatedness
Type of need satisfaction			
Autonomy	**−.30****	−.04	−.01
Competence	−.07	**−.23***	−.05
Relatedness	−.15	−.12	**−.34****

Note. Each column represents one regression analysis. Coefficients are standardized betas. Bolded coefficients were predicted by theory.
*$p < .05$. **$p < .01$.

motivation score and no significant associations involving noncorresponding satisfaction scores. Apparently, those relatively high in autonomy, competence, or relatedness need satisfaction showed less interest in experiences of that type, and those low in satisfaction showed more interest in experiences of that type. Notably, exploratory analyses found no Need $\times$ Need interactions in this pattern; thus, for example, low autonomy satisfaction did not predict even greater autonomy motivation in the presence of low or high competence satisfaction and so on.

Recall that we measured each need's satisfaction with three positively worded and three negatively worded items. Although negatively worded items are typically used primarily for psychometric reasons (i.e., to balance out the effects of response sets), it seemed that the difference between positively and negatively worded need-satisfaction items might have substantive meaning in this case, just as positive and negative affect are often found to have substantively different correlates (Diener & Emmons, 1984). Thus, in a subsidiary analysis, we repeated the three regression analyses above by breaking the focal need for each analysis down into a positive and a negative subscale. Which subscale best predicts wanting experience X: variations in the feeling that one is missing it (the negatively worded items, i.e., "I felt unappreciated by one or more important people") or variations in the feeling that one has it already (the positively worded items, i.e., "I felt close and connected with other people")?

In all three analyses, only the negative satisfaction score was significant in predicting the corresponding motivation variable (βs for the negative autonomy, competence, and relatedness variables were .30, .28, and .34, respectively; βs for the positive scores were $-.05$, .01, and $-.08$, respectively; no other coefficients were significant in these analyses). Thus, for example, participants high in "feeling unappreciated" wanted more relatedness, but participants high in "feeling close and connected with others" did not want less relatedness. We next consider the implications of this finding.

Brief Discussion

Study 1 provided good preliminary support for the needs-as-motives hypothesis, showing that a relative deficit in each of the three needs proposed by SDT uniquely predicts wanting experiences of that type,

once nonspecific covariation between the needs is removed. This did not have to be the case: People can perceive themselves as lacking in many characteristics or qualities (such as being outgoing, detail oriented, or friendly) without necessarily feeling that they want those qualities. Thus missing autonomy, competence, and relatedness do indeed seem to invoke a corresponding motivational orientation, as Baumeister and Leary's (1995) criteria for identifying basic needs would require, providing a new type of support for SDT's needs theory.

Study 1 also demonstrated that it was the negatively worded items, and not the positively worded items, that explained the association. This fits a "deficiency" perspective upon needs, according to which lacking a need prompts ameliorative responses. Notably, the fact that the positive satisfaction items did not negatively predict the corresponding motivation items argues against the idea that people orient away from a particular need once it is satiated. Instead, it appears that even individuals experiencing high levels of positive satisfaction are no less desirous of further such experiences. We examined this subsidiary issue further in subsequent studies.

STUDY 2

Although the Study 1 findings are consistent with the needs-as-motives hypothesis, the correlational design of the study left open a number of alternative interpretations of the data besides the causal interpretation we have proposed. To address this issue we conducted an experimental study in which participants were exposed to a manipulation designed to undermine either their sense of autonomy, their sense of competence, or their sense of relatedness. As dependent measures, we again employed the three motivation measures used in the earlier study. We hypothesized that participants would report relatively stronger motivation toward the specific type of experience that had just been undermined.

Methods

Participants and Procedure

Participants were 74 introductory psychology students at the University of Missouri, 46 men and 28 women. They participated to help satisfy a course requirement. Twenty-seven participants were assigned to the re-

latedness threat condition, 25 to the autonomy threat condition, and 22 to the competence threat condition.

Manipulations

To undermine relatedness we used the false feedback manipulation developed by Baumeister, DeWall, Ciarocco, and Twenge (2005). In this procedure, participants first complete some personality test items. Later, ostensibly after tabulating these responses, the experimenter returns to deliver "tailored feedback" to the participant, reading from a computer printout. First, to build credibility, participants were given accurate feedback regarding their level of Openness to Experience, Conscientiousness, and Extroversion, along with a brief explanation of what each trait means (e.g., "You have a medium level of conscientiousness. That means you like some structure and punctuality, but still see the need for some spontaneity and fun"). After this, participants were told about an ostensible "possible problem area" for the future. We added a new opening sentence ("Your responses reveal elements of the trait of socially avoidant personality."), then gave the rest of Baumeister et al.'s false feedback verbatim: "This type often ends up alone later in life. So, although you may have friends and relationships now, by your mid-20s most of these will have drifted away. You may even marry or have several marriages, but these are likely to be short-lived and not continue into your 30s. Relationships don't last, and when you're past the age where people are constantly forming new relationships, the odds are you'll end up being alone more and more."

To undermine competence, we modified the above "problem area" to say: "Your responses reveal elements of the trait of disorganized/ineffectant personality. This type finds it tough to succeed in life. You may be doing well here in university, but when you graduate into the bigger world, you will find it much more of a struggle. You may get hired for some good jobs, but these are likely to be short-lived and not continue into your 30s. Employers will expect a lot more than they do now, and won't cut you the slack that your teachers have cut you. Once you have had some failures, the odds are you'll find it harder and harder to get anywhere." To undermine autonomy, we modified the feedback to say: "Your responses reveal elements of the trait of passive-dependent personality. This type often ends up with little autonomy in life. So, you may have a fair amount of choice now here in university, but by your mid-20s the real world will have taken most of your freedom away. You may have some options at first, but is likely by your 30s that you will be stuck in a boring job where people always tell you what to do. This will affect how you think, dress, and talk, and your real individuality and desires will become more and more submerged over time." After it was read to them, participants were left with a copy of this

printout. Later in the session, participants were given a questionnaire that contained the need-motivation items. They read: "Below is a set of life-changes that a person might succeed in making. Please rate how much you would like to be able to make each change."

Need-Relevant Motivations

We used the same six items as in Study 2 to assess peoples' motivation to experience each type of need. A 1 (*not at all*) to 5 (*very much*) scale was employed, and autonomy, competence, and relatedness motivation variables were again computed from these responses. In addition, we measured participants' motivations in a second way, by presenting the items in sets of three (one autonomy motivation item, one competence motivation item, and one relatedness motivation item) and asking participants to rank-order the three items within each set. Ranked autonomy, competence, and relatedness variables were computed by reversing the rankings then summing the rankings for each type of need. Because the corresponding Likert and ranking variables were positively correlated, we also *z*-scored the measures and computed composite autonomy, competence, and relatedness motivation variables by averaging the Likert and ranking measures.

Results

Table 3 presents the means for the three composite motivation variables, split by condition. As an initial test of our hypothesis, we conducted 3 (type of threat: autonomy, competence, or relatedness) $\times$ 3 (motive type: autonomy, competence, or relatedness) multivariate analyses of variance, with repeated measures on the second factor. We expected to find significant Threat $\times$ Motive interactions, indicating that people's motives differ depending on what type of a blow they have received. For the composite measures, the interaction was indeed significant, $F(4, 142) = 3.66$, $p < .01$. The interaction was also significant for the Likert variables, $F(4, 142) = 2.67$, $p < .05$, and marginally significant for the ranking variables, $F(4, 142) = 2.22$, $p < .07$, taken separately.

Follow-up t tests on the composite measures revealed that relatedness motivation in the relatedness threat condition was higher than relatedness motivation in the other two conditions, collapsed together, $t(72) = 2.85$, $p < .01$ (see Table 5), and competence motivation in the competence threat condition was higher than competence motivation in the other two collapsed conditions, $t(72) = 2.07$, $p < .05$. Counter to hypotheses, however, autonomy motivation in

Table 3
Study 2: Need-Relevant Motivation Scores Split by Experimental Condition

	Type of Motivation		
	Autonomy	Competence	Relatedness
Type of threat			
To autonomy	**−.07**	−.09	−.11
To competence	.24*	**.26***	−.30
To relatedness	−.03	−.14	**.33***

Note. Within each column, the bolded mean is predicted to be larger than the other two means within that column. In the autonomy motivation analysis, however, the competence threat mean is significantly greater than the other two means.
*$p < .05$.

the autonomy condition did not differ from autonomy motivation in the other two threat conditions ($p > .05$). Instead, competence motivation differed in this condition. Possible reasons for this will be considered below.

Brief Discussion

Study 2 showed, via an experimental methodology, that threatening participants' relatedness and competence needs serves to instill a desire to solve that particular problem and only that problem. This offers a new type of support for the needs-as-motives hypothesis, showing that situations that bring about deficits in at least these two proposed needs can cause corresponding motivations. The finding regarding the relatedness need is conceptually similar to other "social exclusion" findings (Carvallo & Gabriel, 2006; Gardner et al., 2005; Maner et al., 2007) but extends them to a self-report measure of aroused social motivation. The finding regarding competence threats extends Baumeister and colleagues' (2005) social exclusion analysis to a second potentially important need, for competence (or alternatively, for mastery and effectance).

Notably, however, the effect was not observed for the autonomy threat. We believe this is likely because the autonomy threat manipulation was more abstract and not as worrisome as the other two manipulations. In retrospect, participants may not have believed that, by their 30s, the real world would "take your freedom away,"

or, if they did believe it, may not have been able to summon a very vivid image of what exactly an unfree 30-year-old life would look like. Given the many deleterious effects shown for concretely controlling (vs. autonomy-supportive) manipulations in past SDT research (Deci & Ryan, 2000), we see this as a problem with this particular manipulation and not the needs-as-motives perspective in general. It is also noteworthy that the autonomy threat generated the largest desire for competence; participants may have interpreted what we had conceptualized as an autonomy threat (i.e., "you will be stuck in a boring job where people tell you what to do") as being the inevitable upshot of ineffective functioning, leading them to want to enhance their competence. Future research is warranted to develop an autonomy threat that is more specifically compelling to participants. Future research should also examine whether need deprivation in the present, rather than some imagined future, has the same kinds of effects as those observed here. Baumeister et al. (2005) also assumed that their "future self" manipulation undermines current satisfaction and typically found identical effects between these and present-oriented threats (such as being ostracized by a confederate), but it is possible that the hypothetical nature of the scenario might produce different effects than would an actual undermining of satisfaction in the present.

STUDY 3

In Study 3 we tested our hypotheses in yet another way, by conducting a short-term (6-week) longitudinal study. We asked, "Are changes in participants' levels of need satisfaction associated with corresponding changes in the perceived desirability of the three needs?" By controlling for participants' own initial baselines, such data would rule out the possibility that the associations found in Study 1 reflect stable dispositional factors that have nothing to do with the dynamic processes assumed by need theorists. Therefore, such data would further reinforce our causal arguments and further support SDT's propositions concerning basic needs.

Methods

Participants and Procedure

Participants were 327 psychology students at the University of Missouri, 137 men and 165 women (25 participants did not supply gender infor-

mation), who participated for extra course credit. Two in-class questionnaires were administered, 6 weeks apart. Both questionnaires first assessed participants' current need satisfaction and then asked participants to rate their desire for a variety of types of experiences.

Measures

Psychological need satisfaction. To measure need satisfaction at each time period we used the same 18-item scale used in Study 1, in which each need was measured by 6 items (3 positive and 3 negative). Participants rated how well each item described the most recent week of their lives, using a 1 (*strongly disagree*) to 5 (*strongly agree*) scale.

Need-relevant motivations. We used the same six items used in Studies 2 and 3 to assess peoples' desire to experience each type of need. A 1 (*not at all*) to 5 (*a great deal*) scale was employed to assess participants' agreement with each item.

Results

Table 4 contains means, standard deviations, and correlations among the 12 study variables. As a preliminary analysis, we tested whether the Study 1 cross-sectional results would replicate at each of the two time points in Study 3. Specifically, we conducted three regressions at each time point, six in all, to predict a particular motivation variable from the three need-satisfaction variables at that time. In all six cases the motivation variable was significantly negatively predicted by the corresponding need-satisfaction variable (βs ranging from .14 to .29, all ps $< .05$). Three nonpredicted associations were significant in these analyses: Relatedness satisfaction predicted lower autonomy motivation at both times (βs $= -.11$ and $-.17$, respectively, ps $< .05$ and .01) and also predicted more competence motivation at Time 1 ($\beta = .16$, $p < .01$). Thus, of 18 critical associations examined in these analyses, all 6 predicted effects were significant, as were 3 nonpredicted effects, whereas the remaining 9 nonpredicted effects were nonsignificant, as expected.

To test our primary longitudinal hypotheses, we conducted three regressions predicting a particular Time 2 motivation variable (e.g., autonomy motivation) from the same Time 1 motivation variable (so that change in motivation would be the focal dependent measure) and from the six need-satisfaction variables (autonomy, competence, and relatedness satisfaction measured at Time 1 and at Time 2; hence

Table 4
Study 3: Descriptive Statistics and Correlations

	M	*SD*	1	2	3	4	5
Time 1							
1. Autonomy Nsat	1.05	1.32					
2. Competence Nsat	0.64	1.22	.33**				
3. Relatedness Nsat	1.25	1.38	.38**	.37**			
4. Autonomy Mot	3.04	1.07	**−.36****	−.22**	−.25**		
5. Competence Mot	4.03	0.84	−.06	**−.14****	.09	.25**	
6. Relatedness Mot	3.38	1.02	−.16**	−.11*	**−.30****	.50**	.30**
Time 2							
1. Autonomy Nsat	0.94	0.32					
2. Competence Nsat	0.59	1.31	.38**				
3. Relatedness Nsat	1.20	1.49	.51**	.35**			
4. Autonomy Mot	2.94	1.01	**−.39****	−.23**	−.33**		
5. Competence Mot	3.92	0.82	−.09	**−.15****	−.02	.37	
6. Relatedness Mot	3.25	0.98	−.14**	−.10	**−.27****	.50**	.39**

Note. Nsat = need satisfaction; Mot = motivation. Bolded correlations were predicted by theory.
*$p < .05$. **$p < .01$.

changes in need satisfaction were the focal predictors). Table 5 contains the resulting coefficients. Again supporting our hypotheses, change in each of the motivation variables was predicted by change in the corresponding need-satisfaction variables (in addition, reductions in relatedness satisfaction predicted increased autonomy motivation, $\beta = -.15$). Thus, for the 18 critical variables examined in these analyses, the 3 predicted ones were significant, 1 nonpredicted one was significant, and the remaining 14 nonpredicted effects were nonsignificant, as expected. Finally, we again broke each need down to its positively and negatively worded components, both at Time 1 and Time 2. We then conducted three further regressions substituting the two subscales for the scale as a whole, as before. In each of these regressions only changes in the negatively worded version of the scale significantly predicted changes in the corresponding motivation, and changes in the positively worded version of the scale did not; the nonpredicted relatedness satisfaction effect remained significant in the autonomy motivation analysis Thus, for the 24 critical variables examined in these analyses, the 3 predicted effects were significant, 1 nonpredicted effect was significant, and 20 nonpredicted effects were nonsignificant, as expected.

Table 5
Study 3: Longitudinal Regression Results

	Time 2 Motivation		
	Autonomy	Competence	Relatedness
Time 1 motivation (control variable)	.54**	.62**	.62**
Time 1 need satisfaction (control variables)			
Autonomy	.02	−.05	−.08
Competence	.00	.07	−.05
Relatedness	.07	.03	.12*
Time 2 need satisfaction (predictors)			
Autonomy	**−.20****	−.01	.03
Competence	−.05	**−.11***	.04
Relatedness	−.15**	−.01	**−.20****

Note. Each column represents one regression analysis. Coefficients are standardized betas; Time 1 motivation coefficients are test–retest. Bolded coefficients were predicted by theory.
*$p < .05$. **$p < .01$.

Brief Discussion

Study 3 twice replicated the cross-sectional results reported in Study 1. More importantly, Study 3 showed that changes in need satisfaction over a 6-week period predict dynamic changes in the corresponding motivation variables. This within-subject test importantly extends the early findings by showing that they are not just an artifact of some stable response bias or unmeasured individual difference. These results also help to rule out a lay-theory interpretation of the earlier results, in which participants might think "I said I was feeling lonely, so they must expect me to say I want to feel closer to others." Presumably participants did not remember their specific responses and need-satisfaction scores from 6 weeks ago, so they could not apply a lay theory based on those responses.

GENERAL DISCUSSION

In these studies we tried to establish that autonomy, competence, and relatedness, the three basic needs according to SDT, function as motives that affect desires and preferences as well as experiences that

affect well-being. Again, if SDT's evolutionary perspective upon the basic needs is correct (Deci & Ryan, 2000), then it seems a person low in autonomy, competence, or relatedness need satisfaction should not only feel bad, he or she should also be motivated to correct the situation. Conversely, if people seem uninterested in trying to obtain experiences that they are not having, then it seems unlikely that those experiences are really basic needs (Baumeister & Leary, 1995).

Three studies yielded good support for these propositions. In Study 1, the current level of each of the three needs negatively predicted the desire for experiences of that type. In addition, the pattern was specific for each need, such that in the simultaneous regressions, no need was a significant predictor of a noncorresponding motive (i.e., low relatedness satisfaction did not predict greater competence motivation). Study 2 employed a between-subjects experimental manipulation. When participants were falsely threatened with impoverished competence or relatedness experiences over the coming decades of their life, they reported being more motivated to do something to obtain the corresponding experiences in the present. Finally, Study 3 provided further support for our dynamic perspective by showing that changes in need satisfaction, occurring over a 6-week period, predict changes in the desire for the corresponding experiences. Most specifically, those who felt relatively more incompetent, unconnected, or nonautonomous at the end of the study than they had at the beginning also had an increased desire to make life changes in order to feel more (respectively) competent, connected, or autonomous. Across all three studies, then, psychological need satisfaction variables lined up with the associated behavioral preference variables in 14 out of 15 tests, excluding the nonfinding for autonomy threat in Study 2.

These results raise a number of interesting theoretical questions and issues. One of these issues, already alluded to, concerns the distinction between "deficiency motivation" and "growth motivation." Again, deficiency motives are said to be eliminated once satisfied, whereas growth motives are said to be strengthened once satisfied (Maslow, 1971). In other words, deficiency needs tend to operate homeostatically and by a negative feedback process, such that they subside when met. In contrast, growth needs (especially the self-actualization need) are said to operate via a positive feedback process, in which needs are strengthened when met. For example, when one

finally experiences truth, tranquility, fulfillment, and so on, one does not "check it off" and move to the next need; instead, one only wants more of that experience.

We see no reason why the basic needs specified by SDT could not operate in both ways, with experienced sufficiencies sometimes sensitizing people to the rewards available and experienced deficiencies motivating specific corrective desires. Indeed, Moller et al. (2008) found evidence for sensitization dynamics such that relatedness satisfaction may promote greater sensitivity to particular relatedness experiences. However, we theorized that the basic needs would function more strongly as deficiency needs, reasoning that psychological needs, if they are evolved, should help people to adapt when problems arise within important life domains. Again, if people feel incompetent, they should try to improve their skills; if people feel lonely, they should try to improve their social connections; and if they feel controlled by others, they should seek greater autonomy, thereby engaging in adaptive behavior. In the introduction we suggested that the predictions were less clear for people experiencing much satisfaction of a particular need. On the one hand, they should be sensitized to the possibility of further gain from this source, but on the other hand, in a balanced system with limited time and resources but multiple true psychological needs, there would be some risk to investing overly heavily in one need if it led one to neglect the others. Presumably, balanced efforts at need satisfaction would produce optimal results.

Our supplementary analyses breaking the need-satisfaction measures into their positively and negatively worded subscales found support for the first assumption, but not for the second. Concretely, those who gave strong ratings to need-satisfaction items such as "I felt pressured and controlled" also gave strong ratings to items such as "I would like to feel greater autonomy in my life," but those who gave strong ratings to need-satisfaction items such as "I felt free to do things my own way" did not give weaker ratings to items such as "I would like to feel greater autonomy." This asymmetry may in part reflect measurement or distributional issues or perhaps dependent variables that do not accurately capture desires to invest future energy in that direction. However, taken at face value, it is noteworthy that although positive surfeits of need satisfaction did not appear to spur greater desires for such experiences, neither did they suppress people's desires. This finding may afford a nice synthesis of the

seemingly contradictory deficiency and growth perspectives upon psychological needs. If people are missing a needed positive experience, they want it; but if they have it, they have no less desire for more such experiences. Such an arrangement might serve to truly optimize the person's overall level of satisfaction over time because people would be addressing problems at the same time that they maintain and consolidate gains.

Another question raised by the current results is whether it is optimal to try to directly satisfy a need. If a person goes into a social interaction thinking, "I must make this person like me," or into an achievement situation thinking, "I must not fail," then the need-satisfaction effort may be thwarted or undermined. Indeed, Schooler, Ariely, and Loewenstein (2003) argued that doing something with the goal of trying to become happy is problematic for happiness, and Sheldon (2004) suggested that people should take only a "sidelong" approach to feeling self-esteem, rather than doing things specifically in order to get self-esteem.

Although this is an important issue, we believe that most need-satisfaction efforts take place without the problematic goals or cognitions described above. Again, a person who is feeling lonely may spontaneously seek out company without necessarily having in mind the focal goal of "using this situation to solve my relatedness problem," and a person who is feeling incompetent may spontaneously pay attention to the missing knowledge or skills without having in mind the goal of "not failing." Evolution should not require conscious goals or intentions for such orienting processes to work. Although it is possible that conscious intentions can work against satisfaction, as in the case of the person who thinks, "I must make this person like me," and it is also possible that such undermining processes are especially pernicious in the case of extreme or entrenched need dissatisfaction, we suggest that these possibilities do not mitigate against the general idea that deficiencies tend to motivate ameliorative responses.

Another interesting issue is the extent to which psychological needs are homeostatically regulated, as some bodily needs are (i.e., for sleep, water, air). In other words, do psychological needs act like drives, which arise from biological deficits and which become increasingly urgent the longer they are unmet (Hull, 1943)? Indeed, the finding that the negatively worded items drove our results is in some ways consistent with this idea. However, we do not believe that

unmet autonomy, competence, or relatedness needs spur "driven" responses, at least not at a biological level. Again, however, there is evidence that experimentally deprived needs can spur immediate compensatory responses, at a *psychological* level (Carvallo & Gabriel, 2006; Gardner et al., 2005; Maner et al., 2007). When people find themselves with less of a needed experience than they are accustomed to (e.g., a student accustomed to deriving a certain flow of competence from receiving "As" and "Bs" receives a "D" on the first test), they may be motivated to take action. Of course this does not always happen, indicating that people will wait, substitute, specialize, compartmentalize, or compensate in many different ways when it comes to meeting their psychological needs. The documentation and categorization of such processes is an exciting future research agenda.

Yet another interesting issue concerns whether there are individual differences that moderate the needs-as-motives effects. SDT has traditionally assumed that the three needs are universal and do not vary across people. Indeed, few if any moderators of need effects on well-being have been identified. Reversing the direction of this causality opens a host of interesting lines of inquiry on the differential *pursuit* of needs, which prior work on the universal *existence* of needs has masked. Although we were unable to examine this issue with the current data, it is not hard to imagine, for example, that although extroverts may have the same *need* for relatedness as introverts, they could be more sensitized to recognizing deficits in it and have greater efficacy for making new acquaintances. Similarly, conscientious people may be better at recognizing and ameliorating competence deficiencies, and those open to experience may be better able to recognize and address threats to their autonomy.

These studies have a number of limitations. First, the primary dependent measures were based on ratings of motivational preferences. Extending the current effects to more concrete behavior would help bridge the divide between self-attributed (i.e., respondent; McClelland, 1985) versus implicit (i.e., operant) motivational processes. It would also be useful to examine the dynamics of need satisfaction and need motivations within daily life, perhaps using diary or experience-sampling methodologies. Do the processes documented herein operate at a daily or hourly level of analysis? Also, autonomy, competence, and relatedness should be tested against other positive experiences or "candidate needs" (Sheldon et al.,

2001). Although these studies established that the three proposed SDT needs operate as expected, it is important to show that this is not the case for other seemingly positive experiences that SDT does not regard as needs (such as self-esteem, popularity, or pleasure). Finally, these studies are limited in their use of solely college undergraduate samples from a part of the United States with limited ethnic and racial diversity.

Despite these limitations, we hope that the current studies have compellingly demonstrated that SDT's three psychological needs can function as orienting motives, not just as required experiences.

REFERENCES

Abramson, L. Y., Seligman, M. E., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology*, **87**, 49–74.

Baard, P. P., Deci, E. L., & Ryan, R. M. (2004). Intrinsic need satisfaction: A motivational basis of performance and well-being in two work settings. *Journal of Applied Social Psychology*, **34**, 2045–2068.

Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Twenge, J. M. (2005). Social exclusion impairs self-regulation. *Journal of Personality and Social Psychology*, **88**, 589–604.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, **117**, 497–529.

Brendl, C. M., Markman, A. B., & Messner, C. (2003). The devaluation effect: Activating a need devalues unrelated objects. *Journal of Consumer Research*, **29**, 463–473.

Carvallo, M., & Gabriel, S. (2006). No man is an island: The need to belong and dismissing avoidant attachment style. *Personality and Social Psychology Bulletin*, **32**, 697–709.

Chirkov, V. I., Ryan, R. M., & Willness, C. (2005). Cultural context and psychological needs in Canada and Brazil: Testing a self-determination approach to the internalization of cultural practices, identity, and well-being. *Journal of Cross-Cultural Psychology*, **36**, 423–443.

Deci, E. L. (1972). Intrinsic motivation, extrinsic reinforcement, and inequity. *Journal of Personality and Social Psychology*, **22**, 113–120.

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, **19**, 109–134.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, **11**, 227–268.

Deci, E. L., Ryan, R. M., Gagne, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001). Need satisfaction, motivation, and well-being in the work organi-

zations of a former Eastern bloc country: A cross-cultural study of self-determination. *Personality and Social Psychology Bulletin*, **27**, 930–942.
Diener, E., & Emmons, R. A. (1984). The independence of positive and negative affect. *Journal of Personality and Social Psychology*, **47**, 1105–1117.
Filak, V. F., & Sheldon, K. M. (2003). Student psychological need satisfaction and college teacher-course evaluations. *Educational Psychology*, **23**, 235–247.
Gardner, W. L., Pickett, C. L., & Brewer, M. B. (2000). Social exclusion and selective memory: How the need to belong influences memory for social events. *Personality and Social Psychology Bulletin*, **26**, 486–496.
Gardner, W. L., Pickett, C. L., Jefferis, V., & Knowles, M. (2005). On the outside looking in: Loneliness and social monitoring. *Personality and Social Psychology Bulletin*, **31**, 1549–1560.
Hull, C. L. (1943). *Principles of behavior: An introduction to behavior theory*. New York: Appleton-Century.
La Guardia, J. G., Ryan, R. M., Couchman, C. E., & Deci, E. L. (2000). Within-person variation in security of attachment: A self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of Personality and Social Psychology*, **79**, 367–384.
Maner, J. K., DeWall, C. N., Baumeister, R. F., & Schaller, M. (2007). Does social exclusion motivate interpersonal reconnection? Resolving the "porcupine problem." *Journal of Personality and Social Psychology*, **92**, 42–55.
Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, **50**, 370–396.
Maslow, A. H. (1971). *The further reaches of human nature*. New York: Viking Press.
McClelland, D. C. (1985). *Human motivation*. Glenview, IL: Scott, Foresman.
McClelland, D. C., Atkinson, J. W., Clark, R. A., & Lowell, E. L. (1953). Origins of achievement motivation. In D. C. McClelland, J. W. Atkinson, R. A. Clark, & E. L. Lowell (Eds.), *The achievement motive* (pp. 275–318). East Norwalk, CT: Appleton-Century-Crofts.
Moller, A., Deci, E. L., & Elliott, A. (2008). *Person-level dynamics of the psychological need to belong: Sensitization to the situation-level value of belonging*. Unpublished manuscript.
Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, R., & Ryan, R. (2000). Daily well being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin*, **26**, 419–435.
Schooler, J. W., Ariely, D., & Loewenstein, G. (2003). The pursuit and assessment of happiness can be self-defeating. In I. Brocas & J. Carrillo (Eds.), *The psychology of economic decisions* (pp. 41–70). Oxford, UK: Oxford University Press.
Sheldon, K. M. (2004). The benefits of a sidelong approach to self-esteem need-satisfaction: A comment on Crocker and Park (2004). *Psychological Bulletin*, **130**, 421–424.
Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction, and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology*, **76**, 482–497.

Sheldon, K. M., Elliot, A. J., Kim, Y., & Kasser, T. (2001). What is satisfying about satisfying events? Testing 10 candidate psychological needs. *Journal of Personality and Social Psychology*, **80**, 325–339.

Sheldon, K. M., & Krieger, L. K. (2007). Understanding the negative effects of legal education on law students: A longitudinal test of self-determination theory. *Personality and Social Psychology Bulletin*, **33**, 883–897.

Sheldon, K. M., & Niemiec, C. P. (2006). It's not just the amount that counts: Balanced need satisfaction also affects well-being. *Journal of Personality and Social Psychology*, **91**, 331–341.

Sheldon, K. M., & Tan, H. (2007). The multiple determination of well-being: Independent effects of positive needs, traits, goals, selves, social supports, and cultural contexts. *Journal of Happiness Studies*, **8**, 565–592.

Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (pp. 261–302). San Diego, CA: Academic Press.